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<p>(54) Title: SYSTEM AND METHOD TO MINIMIZE RETAIL FRAUD UTILIZING TWO-DIMENSIONAL BARCODES PRINTED ON PURCHASE RECEIPTS</p> <p>(57) Abstract</p> <p>Retail loss due to fraudulently presented refund claims is reduced by imprinting upon the purchase receipt (30) a two-dimensional barcode image (40) that encodes detailed merchandise data (240) and any relevant purchaser data (250, 260, 270, 280). The merchandise data is obtained by scanning a barcode attached to the merchandise, and will include at least the stock keeping unit (SKU) for the merchandise. For non-cash payment transactions, purchaser data will include at least one of checking account number and bank, credit, or debit or smartcard account number, finger-print-generated token ID, and signature-generated token ID. When a refund is sought, the purchase receipt is scanned to decode the encoded merchandise and purchaser data from the two-dimensional barcode image.</p>			

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SYSTEM AND METHOD TO MINIMIZE RETAIL FRAUD UTILIZING TWO-DIMENSIONAL BARCODES PRINTED ON PURCHASE RECEIPTS

5 RELATIONSHIP TO PENDING PATENT APPLICATIONS

U.S. patent application 08/853,955 entitled "Modular Signature and Data Capture System and Point of Transaction Payment and Reward System", filed 9 May 1997 and assigned to the present assignee, discloses a flexible
10 point of sale transaction terminal that may be used to practice the present invention.

FIELD OF THE INVENTION

This invention relates to systems and methods to reduce
15 retail fraud, and more specifically to systems and methods to reduce the occurrence of fraudulently returned merchandise.

BACKGROUND OF THE INVENTION

20 Purchasers generally pay for merchandise purchased in a retail transaction using cash, check, credit card, debit card, or smart card. The retail vendor processes the transaction and the purchaser is then given the merchandise and a receipt, for example a cash register receipt.
25 Most purchasers retain the receipt but may subsequently lose the receipt. However, many purchasers will simply give the receipt back to the retail store cashier to dispose of, or just discard the receipt. In some instances the cashier may fail to give the purchaser a receipt, accidentally or intentionally.
30

In general, receipts are not very detailed. As shown by Fig. 1, typically a receipt 10 will contain somewhat nondescript data 20. The receipt will recite the date and
35 dollar amount of purchase, the method of payment (e.g.,

cash, check, credit card), and perhaps a broad description of the purchased item(s), for example, "man's coat".

- 5 The lack of detail in prior art receipts can expose retailer merchants to fraud, especially with respect to merchandise that is being returned to the merchant for a refund by an ostensible purchaser. In the example of Fig. 1, assume that the actual purchaser of the man's coat wishes to defraud the merchant. The purchaser may 10 simply return to the store at a later time with the receipt, locate a similar coat for the same \$99.95 price within the store, and then go to a cashier. The purchaser will say that the coat is being returned, and that a \$99.95 refund is wanted. Absent evidence that this is 15 not the coat whose purchase is documented by the receipt, the merchant must refund the \$99.95. The result is that the merchant has made a gift of the original coat to this customer.
- 20 Other fraudulent individuals may simply find a discarded receipt, in the store or elsewhere, and go to the store identified in the receipt and locate merchandise that generally fits whatever description is recited on the receipt. The individual then seeks to "return" this 25 merchandise for a refund, using the receipt as evidence of a bona fide purchase. Again, absent evidence that this merchandise is not the merchandise referred to in the receipt, the merchant must refund the purchase price.
- 30 Sadly, employees of the merchant may themselves simply process discarded receipts or receipts not given by the employees to actual purchasers, and obtain a refund for themselves. The employee simply notes on the receipt that the purchaser returned the merchandise for cash, and 35 enters a cash refund transaction into the store cash register system. The "refund" is simply pocketed by the unscrupulous employee.

Some stores attempt to minimize this type of fraud by placing customer service departments immediately adjacent to the store entrance. However even in these stores, an unscrupulous person can simply pick out a few items for actual purchase and while the cashier rings up these items present an old receipt and some merchandise just removed from a shelf in the store and ask for a refund. If the cashier points out that the customer should have gone immediately to the customer service department upon entering the store, the customer can simply feign forgetfulness, or non-observance of signs pointing out the refund policy. As a practical matter, however, a refund will generally be given for the fraudulently "returned" merchandise.

Collectively, losses due to fraudulently returned merchandise cost merchants hundreds of millions of dollars annually. These losses, which are presently difficult to constrain, result in higher retail prices across the board for all customers.

Thus, there is a need for a system and method to reduce retail losses arising from fraudulently returned merchandise.

The present invention provides such a system and method.

SUMMARY OF THE PRESENT INVENTION

In a first aspect, the present invention minimizes retail merchant losses resulting from fraudulently returned merchandise by imprinting a two-dimensional barcode on the transaction receipt. This barcode preferably encodes the stock keeping unit ("SKU") number for the merchandise, any serial number of the merchandise, details of payment method, as well as date of the transaction. For a non-cash transaction, the two-dimensional barcoded information also includes credit/debit/smart card account number, or bank account number for check payment transactions. Preferably check payment transactions will uti-

lize a fingerprint capture device and/or signature cap-
ture device at time of sale. Such devices permit elec-
tronically capturing the purchaser's fingerprint and/or
signature and reducing the fingerprint and/or signature
5 to an electronic token identification whose value is
encoded within the two-dimensional barcode.

An individual seeking to return merchandise for a refund
would present the merchant with the sales receipt. An
10 electronic scanner reads the two-dimensional barcode
imprinted on the receipt at time of sale. The cashier is
immediately provided with substantial detail as to the
merchandise actually purchased, as well as some detail
regarding the customer who made the purchase. Any dis-
crepancy between the merchandise actually purchased and
15 the merchandise being returned is immediately identified,
for example, non-agreement in the SKU, perhaps of any
serial number carried by the merchandise.

20 As to purchases made with credit, debit, or smart cards,
the cashier can confirm whether the card now being pre-
sented for the refund is the same card used at time of
purchase. Further, since full card information is known
to the cashier, any refund given shall be credited to the
25 account, and shall not be made in cash.

As to purchases made with a check, the cashier can con-
firm whether the person seeking the refund can identify
the mode of payment for the original purchase and the
30 bank whose check was used. As to instances of an indi-
vidual making the original purchase and a spouse seeking
to obtain a refund, the cashier is in a position to ob-
tain confirmatory details as to identity of the purchas-
er, before deciding whether to honor the refund request,
35 or to require the original purchaser to appear. As the
account information is known to the cashier, any refund
given shall be credited to the bank account, and shall
not be made in cash.

A person seeking a refund can be asked to provide a fingerprint and/or signature from which a token will now be generated for purposes of comparison with a barcode-encoded token made at the time of purchase. As noted, to further reduce fraud, refunds for non-cash purchases shall be made only to the bank account or card account encoded into the purchase receipt. This procedure should minimize instances of individuals including store employees simply using a "found" receipt to obtain cash refunds.

In a second aspect, a method implementing the present invention is provided.

Other features and advantages of the invention will appear from the following description in which the preferred embodiments have been set forth in detail, in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a prior art receipt, issued at the point of sale for an exemplary transaction;

FIG. 2 depicts a receipt imprinted with a two-dimensional barcode at the point of sale, according to the present invention;

FIG. 3 depicts a system for encoding merchandise and user identification data on a printed purchase receipt, according to the present invention;

FIG. 4 depicts a system for decoding merchandise and purchaser identification data from a printed purchase receipt to determine entitlement of a requested refund, according to the present invention;

FIG. 5A depicts method steps used to encode two-dimensional barcode data at point of sale, according to the present invention; and

FIG. 5B depicts method steps used to bone fides of a refund request, based upon decoded two-dimensional barcode data, according to the present invention.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 2 depicts a receipt 30 as it will be printed and issued to a purchaser, according to the present invention. In contrast to the prior art receipt 10 of Fig. 1, receipt 30 includes a two-dimensional barcode 40. Two-dimensional ("2-D") barcodes include bars of different widths, dots, and various irregular-appearing shapes. Collectively, these and other patterns used to create two-dimensional barcodes enable encoding up to about 2 Kbytes of data, substantially more data than can be encoded with conventional barcodes.

Two-dimensional barcode 40 will be unintelligible to the purchaser who is given receipt 30. However, barcode 40 can encode data identifying the merchandise that is the subject of the transaction, as well as data identifying the purchaser who paid for the merchandise. Shown to the right of Fig. 2 is an example of such encoded information, although for more sophisticated merchandise and/or modes of payment, additional information will be encoded.

25 For the exemplary purchase recited in receipt 30, barcode 40 can encode data identifying each item of merchandise purchased as follows: one of the shirts purchased for \$19.95 was the merchant's stock keeping unit SKU 0123458, and was a size 16 collar, long sleeve (32") shirt. The other \$19.95 shirt was the merchant's SKU 2323458, was size 16 collar and was short sleeved. The \$99.95 men's coat was the merchant's SKU 0348576, was blue in color and was size 42R. The encoded SKU numbers will further provide information to the merchant that can identify the source of each item of merchandise, e.g., the manufacturer or producer, as well as other potentially useful data. If the merchandise in question bore a serial number, such serial number will also be encoded within the two-dimen-

sional barcode data. Many electronic devices, for example, carry individual serial numbers.

As described later herein, the sales price of the merchandise is actually generated from the SKU for printing on the receipt and is not per se encoded within the two-dimensional barcode. However for convenience, the righthand portion of Fig. 2 shows the sales price in addition to data available from the two-dimensional barcode.

As will be described later herein, barcode 40 can also encode useful data identifying the purchaser who paid for a non-cash transaction. Such data can include the purchaser's checking account number, or credit card, debit card, smartcard account number, fingerprint-derived token ID number, and/or signature token ID number. Again, it is to be understood that the appearance of barcode 40 per se does not indicate to the purchaser what if any data is represented by the various printed patterns comprising the barcode.

Fig. 3 depicts a preferred system for generating receipt 30 with a two-dimensional barcode 40 printed or otherwise present thereon. Each item of merchandise 100 being purchased will include a scannable barcode 110, typically a conventional one-dimensional barcode, since relatively little information need be communicated. As such, barcode 110 will include the SKU identification number for the item of merchandise (e.g., SKU 0123458) and perhaps a short alpha-numeric description of the merchandise (e.g., men's shirt).

The merchandise barcode 110 is read at the point of sale ("POS") with a conventional scanner unit 120. Scanner units are known in the art and typically direct a laser light beam toward merchandise barcode 110 and read the pattern of reflected or non-reflected light. Data scanned from merchandise barcode 110 is coupled to a

point of sale transaction terminal 180, as shown. The sales price of the item (e.g., \$19.95) is typically stored in a store computer system 190 (or perhaps a store LAN) in a memory table 195. Once the SKU number is read by terminal 180, table 195 can provide the sales price. Thus, POS terminal 180 may be linked to system or LAN 190. If desired, the contents of memory table 195 could be stored or loaded into an appropriate POS terminal 180.

10 Point of sale transaction terminals 180 are known in the art. An especially powerful such unit is the PenWare 3000, available from PenWare, Inc., located in Sunnyvale, CA. U.S. patent application 08/853,955, referenced earlier herein, describes the operation of a modern point of sale transaction terminal 180 that can process checks, various cards, fingerprint-generated tokens, as well as signature capture.

20 Assuming that the purchaser will pay for the merchandise with other than cash, additional information pertaining to the identity of the purchaser will also be known. For example, if the purchaser will pay with a check 130, data 135 identifying the relevant bank and account number will be read using point of sale transaction terminal 180.

25 If payment for the transaction will be made with a credit card, a debit card, or a smartcard, collectively card 140, relevant identifying data 145 will be read from the card using terminal 180. For example, on an ordinary credit or debit card 140, data 145 will be encoded on magnetic tracks within a magnetic stripe. If card 140 is a smartcard, relevant identifying data 145 will be retained within solid state memory disposed within the card. Relevant data 145 may include the purchaser's identity and account number. For a smartcard, data 145 will include the remaining dollar value available for a purchase to be made with the card.

Modern point of sale transaction terminals 180 such as the PenWare 3000 can also accept other input data. For example, a fingerprint capture unit 150 can be used to capture the purchaser's fingerprint 155 during time of purchase. Fingerprint capture unit 150 can utilize force, pressure, capacitance, electrostatic, or other phenomenon resulting from a user pressing a finger against a portion of the unit to create a fingerprint 155. Unit 150 electronically examines a portion of fingerprint 155 and generates therefrom a token identification number corresponding to the scanned portion. This number can be used as a token ID that is input to terminal 180. Unit 180 can encode this token ID as a reasonably unique tool to recognize the same purchaser at a later date, for example when trying to return merchandise 100.

If a card 140 is used for payment, it may be useful to also provide a signature capture device 160 that captures a signature 165 written on the device with a stylus or pen 170 during the transaction by the purchaser. Electronics within device 160 can reduce the captured signature data to a signature token that can be used as a PIN that is input to terminal 180. This use of a portion of captured signature data is somewhat analogous to unit 150's use of a portion of captured fingerprint data to generate a fingerprint token ID. Of course device 160 can also be used to confirm bona fides of signature 165 by comparison with a known true signature retained in a databank accessible to terminal 180.

The output from scanner 120 and data 135, 145, 155, 165, or any of such data, is input to electronics 185 within point of sale transaction terminal 180. Electronics 185 includes a microprocessor that executes a software routine storable within unit 180 that examines the scanner 120 output and various other data and creates the two-dimensional barcode image. A two-dimensional barcode image file created by electronics 185 is output from

point of sale transaction terminal 180 to the input of a printer 200. Printer 200 then prints receipt 30 with two-dimensional barcode 40 imprinted thereon. Upon completion of the purchase transaction, the purchaser is given merchandise 100 and should also be given receipt 30.

Assume that subsequent to the purchase, an individual possessing receipt 30 enters the merchant's store, goes to an appropriate clothing rack and takes a \$99.95 men's coat. This individual then takes the coat and the receipt to the cashier and asks for a \$99.95 refund.

In the prior art, it could be difficult to prove that this particular coat is other than the coat referred to in the purchase receipt. However with the present information, a great deal of information is available to the cashier to assist in determining whether a refund is justified.

Referring to Fig. 4, the cashier will take receipt 30 and scan the two-dimensional barcode 40 with an appropriate two-dimensional scanner 210. Such scanners are known in the art. An exemplary two-dimensional barcode scanner is the Image Team model 4400, commercially available from Welch Allyn in New York. Information decoded by scanner 210 from barcode 40 may be output on a device 220, for example a computer display and/or a printer.

As shown in Fig. 4, the decoded barcode information 230 will preferably include data 240 identifying each piece of merchandise referred to on the receipt. Thus as to the coat in question, the cashier knows that the purchased coat was a men's coat, color blue, size 42 regular, and that the merchant SKU number for the purchased coat was 0348576. Although it is unlikely a coat would bear a serial number, an exemplary serial number is shown as having also been encoded at time of purchase.

The various encoded information is compared to the coat now presented for return. If the coat to be returned is not a blue colored men's coat, or size 42R, or does not correspond to the given SKU (e.g., perhaps the coat being returned is from a different coat manufacturer than the SKU on the receipt recites), the cashier has reasonable grounds to believe the refund request is fraudulent. Similarly if the merchandise has a serial number that is not in agreement with the barcode-encoded serial number, the refund request may be suspect.

Note too that the decoded information 230 can also provide substantial detail 250, 260, 270, 280 as to the purchaser who bought the coat referred to in the receipt. For example if payment was made with a check, the relevant bank and bank account data 260 can be included in information 230. In this example, the cashier may wish to ask the individual returning the coat to identify the person who made the purchase, or to identify the bank against which the purchase check was drawn. If a check was used, the purchaser's driver's license data 260 can also have been encoded into the two-dimensional barcode. If the purchase was made with a credit or debit or smartcard, relevant account identification information 270 will be present in the decoded two-dimensional barcode data.

If at the time of purchase a fingerprint token ID and/or signature token ID was generated, this token ID data 280 can also be included in information 230. Assume that token ID data 280 were in fact encoded within information 230 at time of purchase. The person now seeking the refund can be asked to use a unit 290 (which may be identical to unit 150) with fingerprint scanning capability to make a scannable fingerprint 300. (By "scannable" it is meant that unit 290 converts the fingerprint or fingerprint portion to gray scale at each (x,y) coordinate for further electronic processing.) Unit 290 will then generate a token value from the data obtained from fin-

gerprint 300. This token value should agree with information 280 if the person seeking to make the refund claims to be the same person who paid for the purchase. As noted, retail store policy should be that refunds are made only to the purchaser's bank account or card account; cash refunds are only available for cash purchases.

Similarly, the person seeking the refund can be asked to make a signature 305 on an appropriate unit 290 (which may be identical to unit 160). Unit 290 will generate a token ID value that should agree with information 280 if the person seeking the refund claims to be the person who paid for the purchase.

It is to be understood that encoded token ID data 280 is not the number that a purchaser elects as his or her private PIN value. Indeed, as used with the present invention, token ID data 280 is a number generated from a fingerprint and/or signature, whose value is unknown even to the user.

Using any or all of the data 230 encoded within the two-dimensional barcode 40 permits a cashier to make an intelligent decision as to the bona fides of an attempted refund. Further, if the present invention is widely adopted in the marketplace, it is envisioned that as knowledge of the invention becomes known to consumers, the incidence of fraudulent refunds will be further diminished. As this type of retail fraud diminishes, merchant losses will diminish and presumably the retail price of merchandise may decrease.

Note too that because barcode information 230 identifies the purchaser's bank and/or card account, it can be retail store policy that any refund granted shall be made only to the purchaser's bank or card account. This procedure would prevent store employee's and other individual

als from simply tendering or processing a found receipt for a cash refund for a non-cash purchase.

Fig. 5A depicts method steps preferably used to encode two-dimensional barcode data, according to the present invention. At step 310, barcode tags on the merchandise being purchased are scanned, e.g., with scanner 120 (Fig. 3) at time of purchase. At the same time, purchaser identification information is also scanned using a point of sale transaction terminal, e.g., terminal 180, for non-cash transactions. As noted in Fig. 3, such purchaser identification information may include any or all of check information, credit, debit, and/or smartcard information, and even fingerprint PIN information. For substantial cash transactions, the cashier could ask the purchaser for his or her name and manually encode such information using point of sale transaction terminal 180.

At step 320, the various merchandise and user information acquired at step 310 is used to create and then print a two-dimensional barcode 40 on receipt 30. A printer 200 preferably includes internal electronics permitting printout of barcode 40 based upon data input to the printer from scanner 120 and point of sale transaction terminal 180.

At step 330, the purchaser receives the merchandise and should also be given receipt 30, which of course will bear barcode 40. At this juncture it is foreseeable that receipt 30 may be discarded by the purchaser, or may be lost, or perhaps will be retained by a dishonest or a careless cashier.

Assume now that an individual presents himself or herself to the cashier, presents a receipt 30 and merchandise, which merchandise may in fact have just been taken from a shelf in the merchant's store. Referring to Fig. 5B, at method step 340, receipt 30 will be scanned with a two-

dimensional scanner, e.g., scanner 210, and the data 230 represented by barcode 40 will be recovered.

Thus, from the decoded barcode information, step 340 will output data pertaining to the merchandise referred to in the receipt 30, as well as any identification relating to the purchaser of such merchandise. It is recognized that the merchandise referred to in receipt 30 may in fact be different merchandise from what is now sought to be returned.

At step 350, the cashier can compare the physical merchandise presented for return with the decoded merchandise data obtained from barcode 40. If there is a substantial discrepancy at this juncture, the refund may be denied. For example, the merchandise being returned may be from a wrong manufacturer, according to decoded SKU information. Alternatively, the size, the color, serial number, or other characteristic of the merchandise may be wrong.

Some discretion may be permitted to the cashier at step 360. Perhaps at time of purchase, a smear on the merchandise barcode 110 (see Fig. 3) could cause a somewhat erroneous SKU. Such errors may be recognizable and thus explainable. If desired, step 360 could be carried out at least in part electronically. The cashier could input, for example into computer electronics within or associated with scanner 210, observations as to the merchandise being returned. For example, the cashier may input merchandise size, color, manufacturer, etc. The electronics could then compare this data with barcode data, taking into account foreseeable scan errors at time of purchase.

Assume step 360 does not result in any substantial discrepancy. Preferably the procedure will now branch to step 370 where any purchaser barcode-provided output data is compared to the person seeking the refund. The refund

seeker may be asked for identification. If the name of the refund seeker differs from any encoded purchaser name data, an explanation may be sought by the cashier. For example, a husband might have made the purchase and his wife, who perhaps has a different last name, now seeks the refund. However the refund seeker should be able to provide at least the name of the purchaser. If the refund seeker wishes to have a refund credit made to a credit or debit or smartcard, any discrepancy in identification between such card and the card used to make the purchase should be explained to the satisfaction of the cashier. Step 370 can also be used to compare a now-generated signature token ID and/or a now-generated fingerprint token ID with any two-dimensional barcode encoded such token ID(s). If there is no discrepancy, a refund is warranted. If there is a discrepancy, the refund request would appear to be made by an individual who did not make the purchase. If the individual insists he or she did make the purchase, the refund request may be fraudulent.

If satisfactory explanations are available to the questions raised at step 380, a refund should be given to the purchasing bank account or card account. A cash refund should be given only if the original purchase was paid for with cash. If satisfactory explanations are not available, the refund may be denied, or perhaps granted providing further information is obtained as to the person seeking the refund. Such further information may be stored for future use, or may be provided to a merchant-wide service that maintains a database of suspicious refund type transactions.

Clearly the discretion exercised at steps 360 and 380 will take into account the magnitude of the refund, future good will, any past history of purchases by the person seeking the refund, etc. Clearly a relatively large value refund must be more closely scrutinized than a \$4.99 refund for a box of nails at a hardware store.

While the present invention cannot be ensured to be 100% fool-proof, its implementation can substantially reduce retailer loss due to fraudulently returned merchandise.

- 5 Modifications and variations may be made to the disclosed embodiments without departing from the subject and spirit of the invention as defined by the following claims.

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WHAT IS CLAIMED IS:

1. A system to reduce retail loss due to fraudulently presented claims for a refund for a purchase of merchandise, comprising:

5 a scanner able to scan merchandise data from a barcode attached to said merchandise prior to purchase, said barcode including at least a stock keeping unit (SKU) identifying said merchandise;

10 a point of sale transaction terminal, coupled to receive scanned said merchandise data from said scanner, and coupled to accept at least one type of purchaser data selected from a group consisting of (a) if a purchaser wishes to pay for said merchandise by check, identification of account number and bank issuing said check, (b) 15 if a purchaser wishes to pay for said merchandise using a card, identification of account number and issuer of said card, (c) a fingerprint token ID generated from a fingerprint of said purchaser during payment for said merchandise, and (d) a signature token ID generated from a signature of said purchaser during payment for said merchandise;

20 a unit, coupled to said point of sale transaction terminal to receive scanned said merchandise data and to receive said purchaser data, generating a file of a two-dimensional barcode image that encodes at least one of said merchandise data and said purchaser data; and

25 a printer, coupled to said point of sale transaction, to print a purchase receipt for said merchandise and to print on said purchase receipt said two-dimensional barcode image;

30 wherein if a refund is later sought for said merchandise, said two-dimensional barcode image on said purchase receipt provides decodable merchandise and purchaser data to assist a vendor of said merchandise in determining whether a refund shall be made.

35 2. The system of claim 1, wherein said two-dimensional barcode image encodes said merchandise data and said purchaser data.

3. The system of claim 1, wherein said card is selected from a group consisting of (i) a credit card, (ii) a debit card, and (iii) a smartcard.

5 4. The system of claim 1, wherein said merchandise data includes any serial number associated with said merchandise.

10 5. The system of claim 1, wherein said merchandise data includes at least one of (a) identification of a manufacturer of said merchandise, and (b) identification of said merchandise.

15 6. The system of claim 1, wherein said point of sale transaction terminal provides said unit with retail sales price of said merchandise for printing by said printer.

20 7. The system of claim 1, further including:
a two-dimensional barcode scanner unit, able to scan and decode any said merchandise data and any said purchaser data encoded in said two-dimensional barcode image on said purchase receipt; and

25 a display unit, coupled to said two-dimensional barcode scanner, to display decoded said merchandise data and decoded said purchaser data;

30 wherein a merchant viewing said display unit can determine whether said merchandise referred to on said purchase receipt is described by said merchandise data decoded from said two-dimensional barcode image.

35 8. The system of claim 7, wherein a merchant viewing said display unit can further determine whether an individual now presenting merchandise for a purchase receipt is described by said purchaser data decoded from said two-dimensional barcode image.

9. A system to reduce retail loss due to fraudulently presented claims for a refund for a purchase of merchandise, comprising:

5 located at a point of purchase, a scanner that scans merchandise data from a barcode attached to said merchandise, said barcode including at least a stock keeping unit (SKU) identifying said merchandise;

10 located at said point of purchase, a point of sale transaction terminal, coupled to receive scanned said merchandise data from said scanner, coupled to receive retail sale price for said merchandise, and coupled to accept at least one type of purchaser data selected from a group consisting of (a) if a purchaser wishes to pay for said merchandise by check, identification of account number and bank issuing said check, (b) if a purchaser wishes to pay for said merchandise using a card, identification of account number and issuer of said card, (c) a fingerprint token ID generated from a fingerprint of said purchaser during payment for said merchandise, and (d) a signature token ID generated from a signature of said purchaser during payment for said merchandise;

15 20 means, coupled to said point of sale transaction terminal, for receiving scanned said merchandise data and said purchaser data and for generating therefrom a file of a two-dimensional barcode image that encodes at least one of said merchandise data and said purchaser data;

25 30 a printer, coupled to said point of sale transaction, to print a purchase receipt for said merchandise and to print on said purchase receipt at least said two-dimensional barcode image;

35 located at a point of merchandise return, a two-dimensional barcode scanner unit to scan and decode any said merchandise data and any said purchaser data encoded in said two-dimensional barcode image on said purchase receipt; and

a display unit, coupled to said two-dimensional barcode scanner, to display decoded said merchandise data and decoded said purchaser data;

wherein a merchant viewing said display unit can determine whether said merchandise referred to on said purchase receipt is described by said merchandise data decoded from said two-dimensional barcode image, and if 5 not so described knows to question a request for refund.

10. The system of claim 9, wherein a merchant viewing said display unit can further determine whether an individual now presenting merchandise for a purchase receipt is described by said purchaser data decoded from said two-dimensional barcode image, and if not so described knows to question a request for refund.

15. 11. The system of claim 9, further including means for generating, at said point of merchandise return, a fingerprint token ID from a fingerprint of an individual seeking said refund for comparison with a fingerprint token ID encoded in said two-dimensional barcode image.

20 12. The system of claim 9, further including means for generating, at said point of merchandise return, a signature token ID from a signature of an individual seeking said refund for comparison with a signature token ID encoded in said two-dimensional barcode image.

25 13. The system of claim 9, wherein said two-dimensional barcode image encodes said merchandise data and said purchaser data.

30 14. The system of claim 9, wherein said card is selected from a group consisting of (i) a credit card, (ii) a debit card, and (iii) a smartcard.

35 15. The system of claim 9, wherein said merchandise data includes any serial number associated with said merchandise.

16. The system of claim 9, wherein said merchandise data includes identification of a manufacturer of said merchandise.

5 17. The system of claim 9, wherein said merchandise data includes identification of said merchandise.

10 18. A method of reducing retail loss due to fraudulently presented claims for a refund for a purchase of merchandise, comprising the following steps:

15 (a) at time of said purchase, providing a purchaser of said merchandise with a purchase receipt having printed thereon at least a two-dimensional barcode image that encodes merchandise data including at least a stock keeping unit (SKU) identifying said merchandise; said two-dimensional barcode image further encoding at least one type of purchaser data selected from a group consisting of (i) if a purchaser wishes to pay for said merchandise by check, identification of account number and bank issuing said check, (ii) if a purchaser wishes to pay for said merchandise using a card, identification of account number and issuer of said card, (iii) a fingerprint token ID generated from a fingerprint of said purchaser during payment for said merchandise, and (iv) a signature token ID generated from a signature of said purchaser during payment for said merchandise;

20 (b) upon completion of said purchase, giving said purchaser said merchandise and said purchase receipt;

25 (c) upon request for a refund ostensibly for said merchandise, decoding from said two-dimensional barcode image on said purchase receipt said merchandise data and said purchaser data;

30 (d) comparing encoded said merchandise data with merchandise being presented for refund to determine whether said merchandise now presented is identical to what is described by said merchandise data;

35 (e) comparing encoded said purchaser data with data now obtained from an individual seeking said refund to

determine whether said individual is described by said purchaser data;

5 (f) if results obtained at step (d) and (e) are acceptable to a vendor of said merchandise, providing said refund to any bank account or any card account represented by said purchaser data and if said purchase was for cash, providing a cash refund to said individual.

10 19. The method of claim 18, wherein step (a) includes scanning barcode data attached to said merchandise, and obtaining said purchaser data as output from a point of sale transaction terminal device.

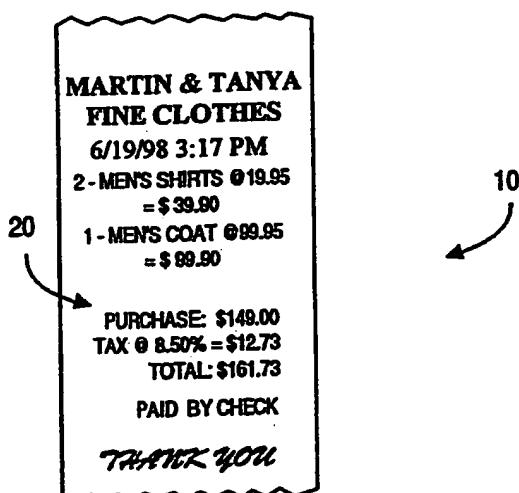
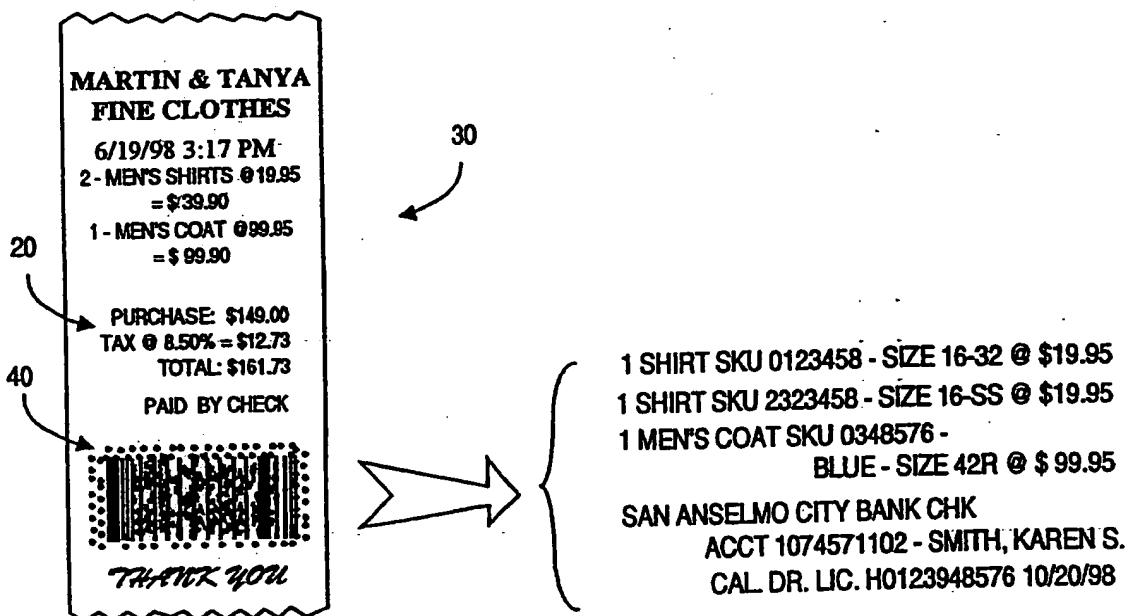
15 20. The method of claim 18, wherein step (c) includes scanning said two-dimensional barcode image with a two-dimensional barcode scanner.

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**FIG. 1 (PRIOR ART)****FIG. 2**

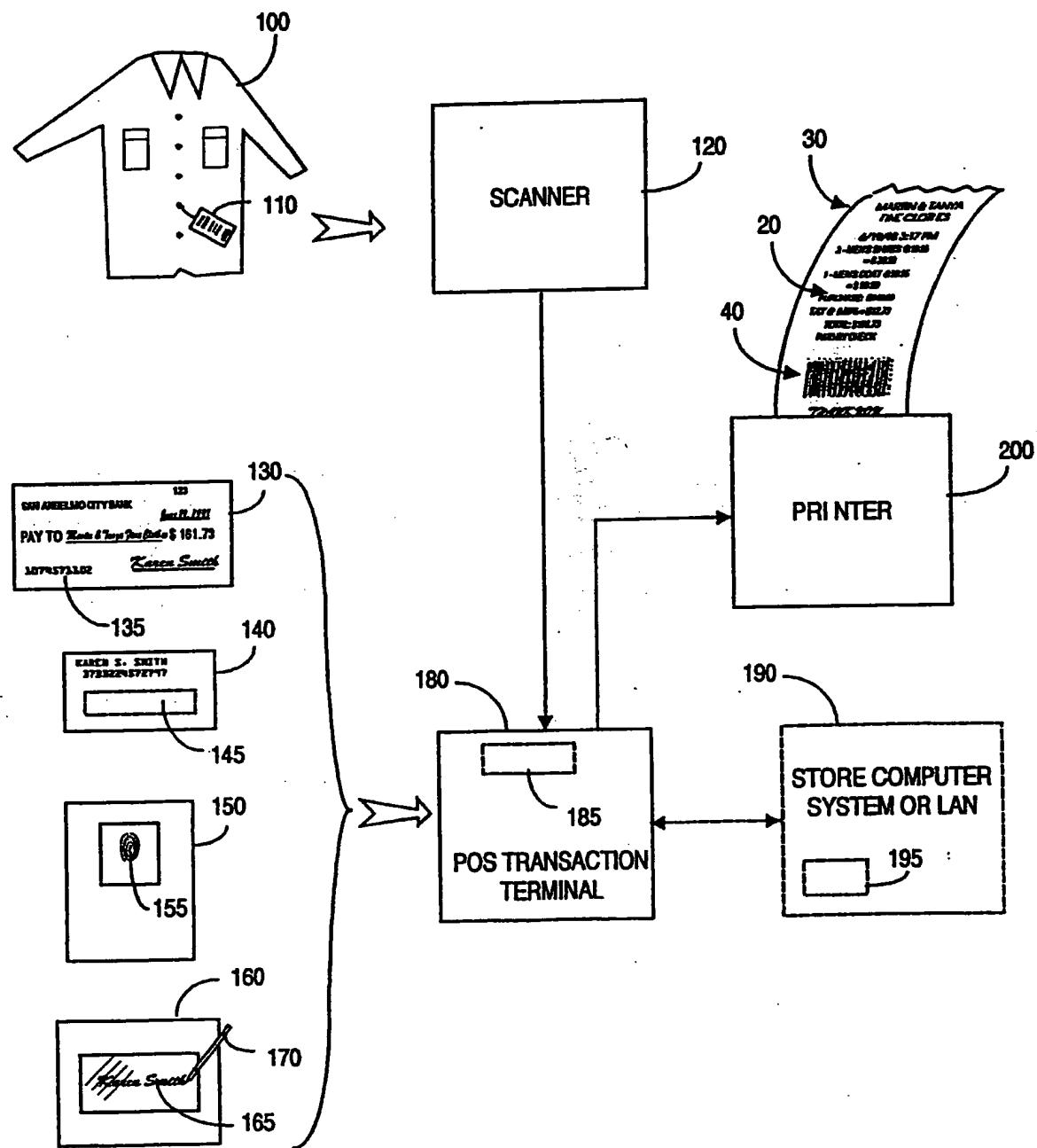
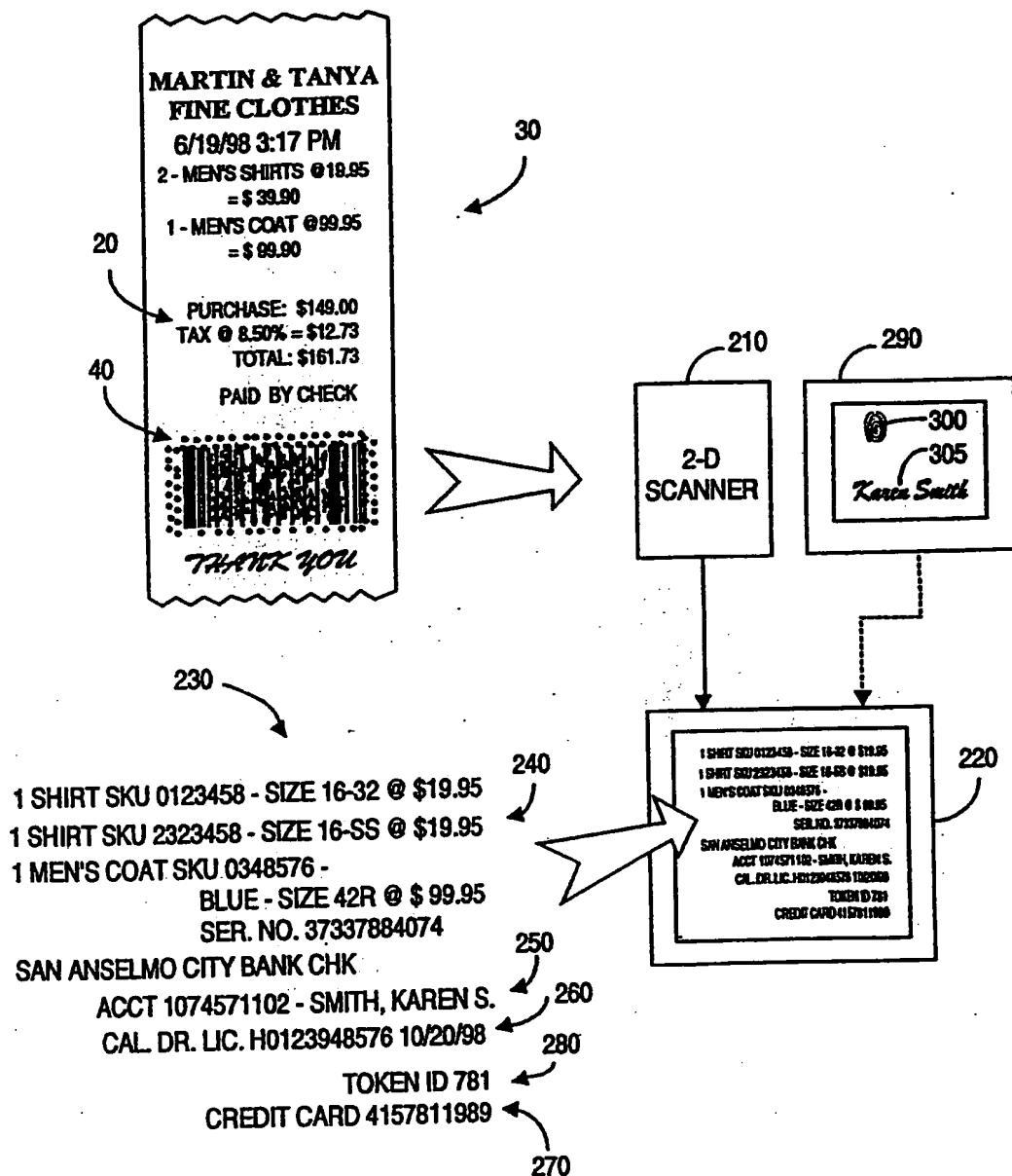
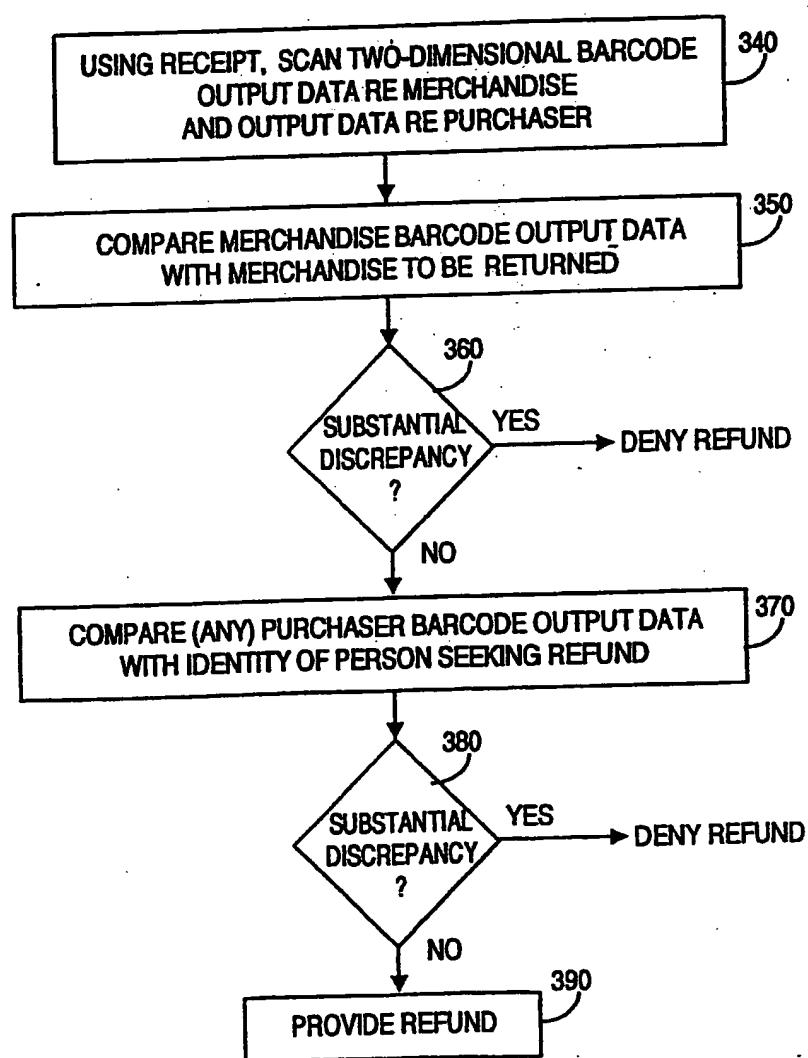
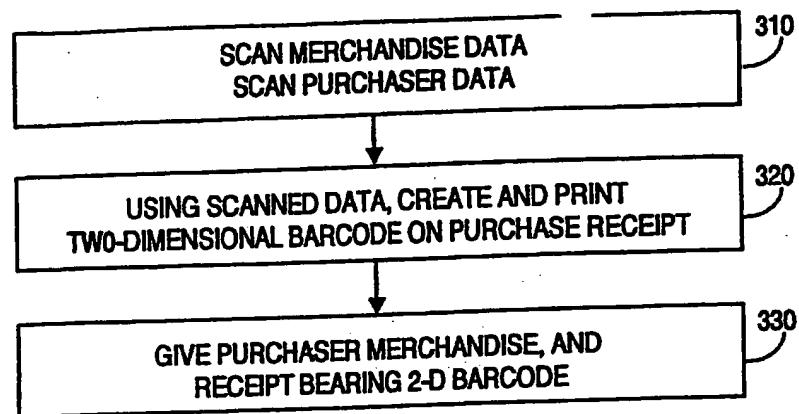


FIG. 3

**FIG. 4**



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/10893

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06K 7/10

US CL : 235.462.01

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 235/375, 378, 379, 380, 383, 432, 440, 462.01, 462.10, 462.13, 462.14, 470, 487; 902/3, 5, 22

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,602,377 A (BELLER et al) 11 February 1997 (11/2/97), see entire document, especially column 4, lines 18-67, column 11, lines 8-40, column 12, lines 18-65.	1-10, 13-20
Y	US 5,594,226 A (STEGER) 14 January 1997 (14/01/97), column 1, lines 64-67, column 2, lines 7-31, 65-67, column 3, lines 1-9, column 4 lines 13-20, 33-51, column 6, lines 1-5.	1-10, 13-20
Y	US 5,509,083 A (ABTAHI et al) 16 April 1996 (16/04/96), abstract, column 1, lines 8-16, column 7, lines 31-44, column 8, lines 58-67, column 13, lines 1-8..	11
Y	US 5,478,993 A (DERKSEN) 26 December 1995 (26/12/95), column 2, lines 2-9.	12



Further documents are listed in the continuation of Box C.



See patent family annex.

Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

23 JUNE 1999

Date of mailing of the international search report

16 JUL 1999

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INTERNATIONAL SEARCH REPORT

International application No. PCT/US99/10893

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,278,396 A (MCGAHN) 11 January 1994 (11/01/94), see entire document, especially column 1, lines 35-62, column 2, lines 17-24, 53-67, column 3, lines 1-17, 32-58, column 4, lines 1-5.	1-10, 13-20
A	JP 06-111133 A (TOKYO ELECTRIC CO LTD) 22 April 1994 (22.04/94), abstract, constitution.	1, 5, 7, 9, 17, 18
A	JP 04-347793 A (TOKYO ELECTRIC CO LTD) 02 December 1992 (02.12.92), abstract, constitution.	1, 5, 7, 9, 17, 18
A	JP 03-127197 A (HITACHI LTD) 30 May 1991 (30.05.91), abstract, constitution.	1, 9, 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/10893

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

APS, GPI WEB

search terms: receipt, slip, barcode, bar code, dataform, machine readable, optical code, fingerprint, signature, card, scanner, reader, terminal, point of sale, pos, cash register